



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/723,533

11/26/2003

Anandaroop Bhattacharya

111079-135105

8659

31817

7590

08/16/2006

SCHWABE, WILLIAMSON & WYATT
PACWEST CENTER, SUITE 1900
1211 S.W. FIFTH AVE.
PORTLAND, OR 97204

EXAMINER

CHERVINSKY, BORIS LEO

ART UNIT

PAPER NUMBER

2835

DATE MAILED: 08/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/723,533

Applicant(s)

BHATTACHARYA ET AL.

Examiner

Boris L. Chervinsky

Art Unit

2835

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 32-39, 41-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozmat in view of Dessiatoun et al.

Ozmat discloses the cooling device for the integrated circuit 3, 9 coupled to substrate 11 including the thermal management device comprising an aluminum case 17 having an inlet and outlet for a cooling medium (claim 41), and a plate 13 that has a cavity (see Fig. 3) enclosing the porous medium 19 as aluminum sponge or foam (claim 37) filling substantially entire cavity attached to the plate 13 (claim 33) and is bonded to the case 17 (col.3, lines 61-63) and cooling fluid such as water (claim 36) circulating through the porous medium in the case, and there is a watertight seal between the case and the integrated circuit; the porous medium is the metal foam made of copper or aluminum (col. 3, lines 44-49). With respect to claim 35, Ozmat discloses elongated porous material as it is shown on Fig. 2 that is showing the fiber layout; several prior art references listed in US PTO 892 Form show the elongated microchannels which can be considered as micropores (see Weber et al., Kenny et al.). Ozmat discloses the claimed invention except the heat exchanger and the pump. Dessiatoun discloses the thermal

management device including the heat exchanger 36 and the pump 38, the inlet coupled to the pump and the outlet coupled to the heat exchanger. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to include the heat exchanger and the pump as disclosed by Dessiatoun in the device disclosed by Ozmat for cooling and circulation of the cooling medium for efficient heat removal. The details drawn to the size of the porous medium (claims 38, 52 and 55) and the size of the integrated circuit (claim 49) would have been an obvious at the time the invention was made to a person having ordinary skill in the art, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). The intended use of the cooling device for an entertainment unit, disk player or networking interface, a dynamic random access memory or input/output interface (claims 54, 57, 58) is obvious since it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987). With respect to claim 48, the thermal interface 13 is coupling the integrated circuit to the case 17. Ozmat discloses the claimed invention except the non-uniform heat distribution or areas of high heat and the porous medium disposed in the casing with consideration of those high heat areas (claims 34, 39, 51, 56). Dessiatoun discloses the cooling device having porous medium disposed accordingly to high heat areas requiring intensified cooling medium flow (see abstract), therefore it would have been an obvious

Art Unit: 2835

at the time the invention was made to a person having ordinary skill in the art to arrange porous medium as disclosed by Dessiatoun in the device disclosed by Ozmat to prevent overheating and eventual malfunction of the electronic device. With respect to claim 42, the functional limitation that the pump fluid flow rate it is too slow can cause the fluid to evaporate and that will result in two-phase fluid flow is obvious. With respect to claim 43, the substrate attached to an Icon one side and the cooling device on the opposite side is obvious and is shown in numerous prior art references listed in US PTO 892 Form and not applied at this time. With respect to claims 44, 45 and 53, the claimed device clearly shows all elements of a typical heat pipe that is also shown in numerous prior art references listed in US PTO 892 Form that are not applied at this time. The method steps of claims 50- 53 are necessitated by the device structure as disclosed by Ozmat and modified by Dessiatoun et al.

3. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozmat in view of Dessiatoun et al. and further in view of Landin et al.

Ozmat discloses the claimed invention except various sizes of the pores in different areas of the porous medium and porosity at or above 80%. Landin discloses a heat exchanger (see Fig. 5) having a porous material enclosed in a housing, the porosity of the material is variable and in the range from 40 to 90% (see abstract). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the porosity in range as disclosed by Landin et al. in the device disclosed by Ozmat for optimum heat conduction.

Art Unit: 2835

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Boris L. Chervinsky whose telephone number is 571-272-2039. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on 571-272-2800 ext. 35. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BORIS CHERVINSKY
PRIMARY EXAMINER

Boris L. Chervinsky
8/11/6